

# Time Lens: An Augmented Reality Cell Phone Application

## Design Iterations and User Study with Paper Prototypes

Sarah Webster  
LBSC 708n Midterm Poster  
Design Workout #3: Paper Prototyping



### Abstract

The poster presents the design iterations and user study that were conducted in the design of a mobile device application. The application is a tool that allows users to explore historical artifacts in the context of their original environment. It builds on the concepts of Augmented Reality and Rephotography. The idea is to bring the experience of viewing a museum gallery out into the world. A user could, for example, choose the gallery for Historical Buildings while standing on the National Mall in Washington, D.C. and see historical photographs of buildings overlaid on top of the present scene. A user could also choose a historical gallery to re-experience a day in the past, such as the day of Martin Luther King’s “I have a dream” speech, viewing those photos while standing in the places they actually were taken.

### Key Concepts

Augmented reality (AR) is a term for a live direct or indirect view of a physical, real-world environment whose elements are augmented by computer-generated sensory input such as sound, video, graphics or GPS data.

~Wikipedia



The Wikitude app points users to nearby Wikipedia entries using geo-location

Rephotography is the act of repeat photography of the same site, with a time lag between the two images; a “then and now” view of a particular area. ~Wikipedia



The U.S. Capitol Building under construction

### Iteration 1: Design Prototype and Storyboard



Image of Iteration 1 Prototype

I recruited an acquaintance in the University of Maryland History Department to participate in the first iteration as a co-designer. We created low fidelity prototypes and brainstormed to identify the main functions, screens, and interactions of the application. We also determined the flow of the screens by arranging the prototype sketches as a storyboard.



Paper Templates for Prototype Sketching

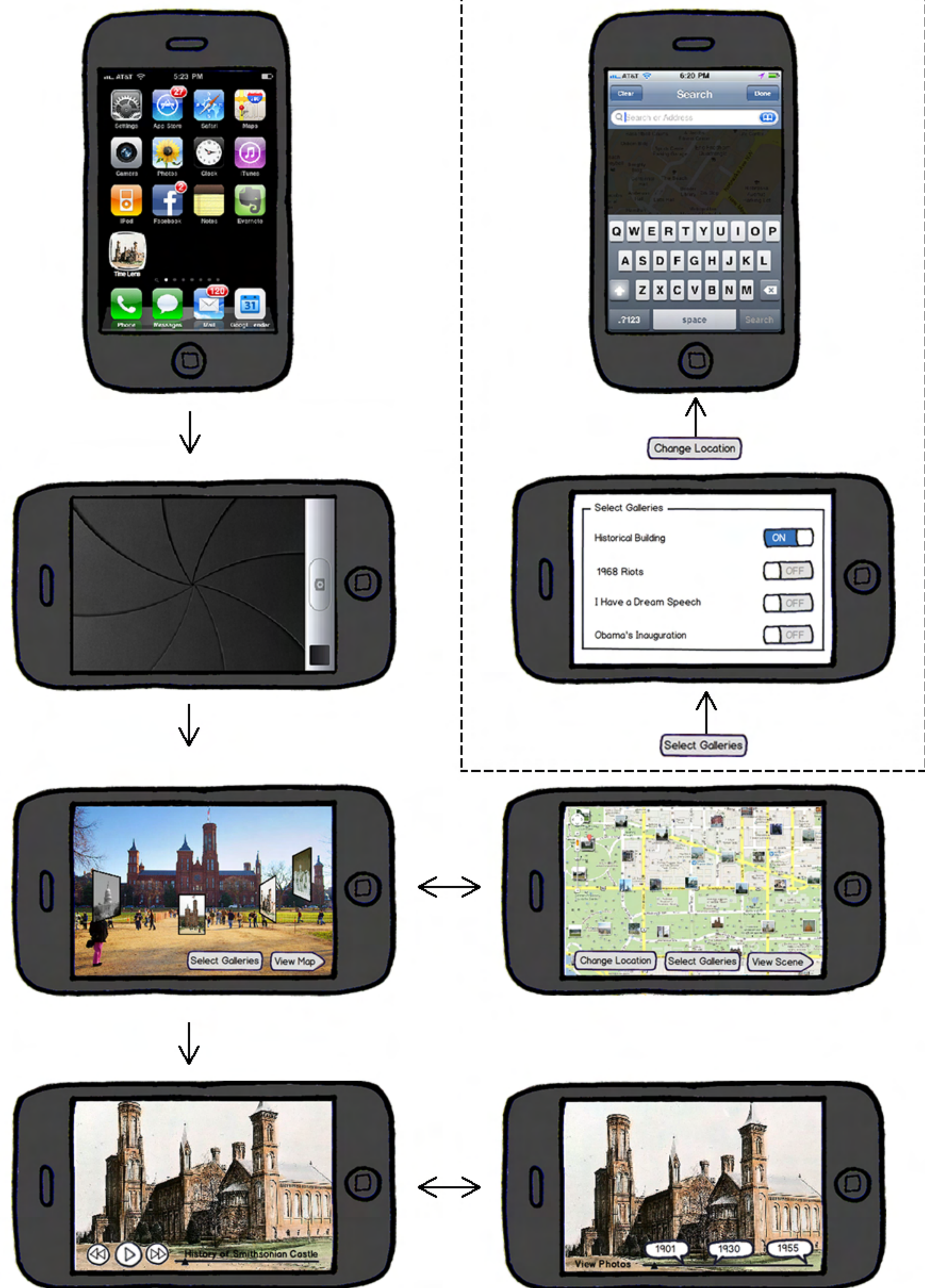
I printed iPhone shaped templates to facilitate easy sketching during this stage. We used pencils to sketch design ideas and post-it notes to capture concepts and display them next to the prototype sketches.



### Iteration 2: User Study Prototype

Based on the initial prototypes, I created higher fidelity prototypes for the user study. The concept of images overlaying a “through the lens” view of reality is not one that is familiar to most people and I wanted to use prototypes that could successfully convey this concept. I printed the prototypes and pasted them onto hard cardboard backs, to simulate the experience of holding a real phone.

#### Screen Flow



#### Menu Screens



### User Study

I approached people on the National Mall in Washington, D.C. and asked them to participate in the user study. I instructed them to interact with the prototypes as if they were a real phone. As they interacted with the prototypes, I replaced the panel they were holding with a new one.



Participant 5 viewing a scene “through the lens”

Participants completed three tasks with the prototypes and provided feedback.

- Task one: View historical photos of the Smithsonian Castle.
- Task two: Select a new “gallery” of historical content.
- Task three: Change the location and view historical content in a new location.

Participants 2 and 4 were very enthusiastic about the application. Participant 4 even showed me an augmented reality application on her current phone created by the National Park Service.



Participant 5 viewing content from a content gallery screen prototype

The most common error was in gallery view, people failed to notice the buttons to move to options in the lower right hand corner. Participant 5 tried to use a swipe gesture to try to access the map view in task 3.

Participant #	Gender	Age	Have you ever heard of augmented reality applications?	Type of cell phone you use	How often do you use smart-phone applications?	What type(s) of smart-phone applications do you use most often (if any)?	Overall level of technical proficiency	Are you visiting DC? Where are you traveling from?
1	Female	52	No	Smart Phone	All the time	Blackberry	Average	Northern Virginia
2	Female	20	No	Smart Phone	All the time	Games, Facebook	Expert	Local
3	Male	32	No	Other	Never	None	Novice	Southern California
4	Female	49	Yes	Smart Phone	All the time	iPhone	Expert	Local
5	Male	23	No	Smart Phone	All the time	Social Media, Sports	Average	Georgia

Participant demographic data collected in user study

### Implications for Future Design Iterations

- Many of the participants’ suggestions were ideas for additional content galleries:
- 1) a gallery based on a time period, e.g. photos taken on the National Mall during the 1960s decade
  - 2) a gallery of content around a topic, e.g. African American history in D.C.
  - 3) a gallery to view planned future buildings
  - 4) a gallery to view an “alternate reality”, e.g. “the day zombies invaded D.C.”
  - 5) the ability to support user supplied content, e.g. similar to the user submitted photos on google maps

- Other suggestions from the user study that would be included in future iteration:
- 1) the need for a Submit button on the Select Galleries screen
  - 2) a feature that would give navigation directions to sites with content
  - 3) the ability to use a swipe gesture to navigate between screens